BURNER ASSEMBLY

CROSS-REFERENCES TO RELATED APPLICATIONS/PATENTS

[0001] This application is a continuation-in-part of U.S. patent application Ser. No. 10/957,252 filed on Oct. 1, 2004 and entitled "Burner Assembly" which relates back to Provisional Patent Application Ser. No. 60/508,138 filed on Oct. 3, 2003 and entitled "Burner Assembly."

FIELD OF THE INVENTION

[0002] This invention relates generally to an improved burner assembly, and more particularly, to an improved burner assembly for heating and drying aggregate materials used in connection with the production of hot mix asphalt.

BACKGROUND AND DESCRIPTION OF THE PRIOR ART

[0003] It is known to use a burner assembly to heat and dry aggregate materials used in connection with the production of hot mix asphalt. See, e.g., U.S. Pat. No. 5,700,143, No. 5,511,970, No. 4,559,009 and No. 4,298,337. However, conventional burner assemblies suffer from several disadvantages. For example, conventional burner assemblies are incapable of producing a flame configuration satisfactory for asphalt production in a variety of different-sized combustion chambers. As a result, burner assemblies typically include adjustable spin vanes or spin racks to accommodate different-sized combustion chambers. For example, U.S. Pat. No. 6,488,496 of Feese et al. describes a compact combination burner with an adjustable spin rack. Adjustable spin vanes, however, increase the cost of manufacture and maintenance, and the amount of labor required to operate the burner. In addition, conventional burner assemblies experience excessive temperatures in the area of the burner flame, resulting in damage to components in the area of the burner flame. Further, in conventional burner assemblies, the components in the area of the burner flame are exposed to debris produced in the combustion chamber.

[0004] It would be desirable, therefore, if an apparatus could be provided that would selectively fire on gaseous fuel, liquid fuel, or both gaseous and liquid fuel. It would also be desirable if such an apparatus could be provided that would fire on gaseous and/or liquid fuels without physically altering the components of the apparatus, changing the firing rate of the apparatus, or shutting down the apparatus. It would be further desirable if such apparatus could be provided that would fire on oil or liquid propane without changing the atomizing nozzle. It would be still further desirable if such an apparatus could be provided that would supply natural gas or propane around the atomizing nozzle for use as pilot fuel. In addition, it would be desirable is such an apparatus could be provided that would produce a stable flame configuration having a short flame length and a narrow flame diameter adapted for use on a wide variety of different-sized combustion chambers. It would also be desirable if such an apparatus could be provided that would more completely and uniformly mix fuel and air in order to obtain more rapid combustion and improve combustion intensity, thereby reducing the combustion space required in the asphalt drum and lowering carbon monoxide (CO) emissions in the combustion space. It would be still further desirable if such an apparatus could be provided that would achieve reduced emissions of the oxides of nitrogen (NOx). In addition, it would be desirable if such an apparatus could be provided that would be capable of firing on low excess air pre-mix gas. It would also be desirable if such an apparatus could be provided that would produce a stabilizing gas base flame. It would be further desirable if such an apparatus could be provided that would reduce the temperature of the dryer drum breech plate where the burner is mounted. It would be still further desirable if such an apparatus could be provided that would eliminate the need to adjust spin vanes to achieve a desired flame configuration. It would also be desirable if such an apparatus could be provided that would be less complicated and expensive to manufacture, operate and maintain than conventional burners. It would be further desirable if such an apparatus could be provided that would reduce the temperatures in the area of the burner flame and the resulting damage to components in the area of the burner flame. It would be still further desirable if such an apparatus could be provided that would reduce the exposure to debris produced in the combustion chamber experienced by components in the area of the burner flame.

ADVANTAGES OF THE PREFERRED EMBODIMENTS OF THE INVENTION

[0005] Accordingly, it is an advantage of the preferred embodiments of the invention described and claimed herein to provide an apparatus capable of selectively firing on gaseous fuel, liquid fuel, or both gaseous and liquid fuel. It is also an advantage of the preferred embodiments of the invention described and claimed herein to provide an apparatus capable of firing on gaseous and/or liquid fuels without physically altering the components of the apparatus, changing the firing rate of the apparatus, or shutting down the apparatus. It is a further advantage of the preferred embodiments of the invention described and claimed herein to provide an apparatus adapted to fire on oil or liquid propane without changing the atomizing nozzle. It is another advantage of the preferred embodiments of the invention described and claimed herein to provide an apparatus that is capable of supplying natural gas or propane to the atomizing nozzle for use as pilot fuel. It is also an advantage of the preferred embodiments of the invention described and claimed herein to provide an apparatus for producing a stable main flame configuration that has a short flame length and a narrow flame diameter. It is also an advantage of the preferred embodiments of the invention described and claimed herein to provide an apparatus for producing a main flame configuration that is adapted for use on a wide variety of different-sized combustion chambers having different-sized combustion spaces. It is another advantage of the preferred embodiments of the invention described and claimed herein to provide an apparatus that more rapidly, completely, and uniformly mixes fuel and air, thereby providing a more rapid combustion, improving combustion intensity, reducing the combustion space required in the asphalt drum, and reducing CO emissions in the combustion space. It is yet another advantage of the preferred embodiments of the invention described and claimed herein to reduce NOx emissions. It is a further advantage of the preferred embodiments of the invention described and claimed herein to provide an apparatus having the capability of firing on low excess air pre-mix gas. It is a still further advantage of the preferred embodiments of the invention described and claimed herein to provide an apparatus for producing a stabilizing gas base flame. It is still another advantage of the preferred embodiments of the invention